B A N G L A D E S H

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Nutrition and Health Surveillance in Urban Slums in Dhaka

Key results for the period: February 2001 to January 2002

Rapid urbanization in Bangladesh is fuelling a growth in urban poverty, particularly in the urban slums where the quality of life is extremely poor. Since its inception in 1990 the HKI/IPHN Nutritional Surveillance Project (NSP) has been source of high quality data on living conditions, health, nutrition, food security and poverty in urban slums of three cities: Dhaka, Chittagong and Khulna. This bulletin presents NSP data collected in 2001 from slums in Dhaka, the largest city in the country. About one-quarter (24%) of households had an energy intake <1805 kcal/person/d, an indicator of 'extreme' poverty. According to international criteria, the prevalence of malnutrition in children and mothers was 'very high' or 'serious' at different times of the year. The relatively high prevalence of diarrhea in mothers and children suggests that environmental sanitation and hygiene conditions were poor, although two contributing factors, access to clean water and closed latrines, were good. Investing in nutrition is crucial because malnutrition contributes to poverty and impedes both social and economic development.

Urban population growth is occurring at an alarming rate throughout Bangladesh. The national census conducted in 2001 showed that the urban population had grown by 38% in the previous ten years, compared with only 10% in rural areas.[1] Much of this growth is caused by the flow of poor rural-urban migrants to slum areas, where appalling living conditions, poor health, malnutrition and poverty are rife. The rapid urbanization shows no signs of abating and the numbers affected by urban poverty continue to rise. Development agencies recognize that there is an urgent need to improve the welfare of poor slum residents and to stem the rise in urban poverty. In order to do so, detailed information on the magnitude and determinants of the problems is needed to design effective policies and programs.

Information generated by the NSP over the past 12 years has helped inform policymakers, program managers and donor organizations on many development concerns in Bangladesh including health, nutrition, food security, gender disparities, and poverty. HKI encourages the use of its surveillance data to facilitate policy and program action for the benefit of the population from whom they were collected. Following the successful experience of the HKI Nutrition and Health Surveillance System (NSS) in data sharing in Indonesia, the data collected by the NSP in Bangladesh in 2001 on key indicators of nutrition, health and their determinants are included in a CDROM that accompanies this series of bulletins.

Data collection in urban slums of Dhaka

Data are collected every 2 mo from a total of at least 700 households in urban slums in Wards 32, 34, 35 and 36 of Dhaka. A convenience sampling procedure was used to select households up to November 2001 and a two-stage cluster sampling design from December 2001. Households are only selected if they contain at least one child aged <5 years. A precoded questionnaire is used to record data from each household on the health and

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nutrition of one mother and all her children aged <5 years; household demography and socio-economic status; household food consumption; natural disasters, household crises and coping strategies; and participation in NGO programs.

Findings presented
In this bulletin, data are presented on a selection of indicators of household demographic and socio-economic status, household food security (loans for food), caring practices (breastfeeding), the performance of national health programs (vitamin A capsule distribution), food consumption (household energy intake and consumption of non-cereal foods), health status (child and maternal diarrhea) and nutritional status (child and maternal nightblindness and anthropometry). The definition and method of data collection of each indicator are described together with the general findings for all NSP urban slum sites and the specific findings for the urban slum site in Dhaka. The figures show the data collected in the Dhaka slums. While the scope of this bulletin is limited to presenting the findings, they serve to facilitate discussion on the immediate and underlying causes of malnutrition and on ways to address it.

Demographic and socio-economic status (See Table)
What is indicated. The demographic and socio-economic status of a household determines the extent to which the household unit can adequately feed and care for all members, provide a healthy environment and gain access to health services. These factors are therefore important determinants of the health and nutritional status of household members.
Data collection method. A series of questions is asked to obtain the information shown in the Table.
Findings. *General* - Demographic and socio-economic conditions varied considerably between the three urban slum sites. *Dhaka slums* - The mean number of household members was lower than in the other two cities. All other demographic and socio-economic indicators were similar to either Chittagong or Khulna or intermediate between the two.

Loan for food in the last month (See Fig 1)
What is indicated. A loan for food is a good indicator of household food insecurity in Bangladesh because it is a coping strategy used when a household is unable to produce or purchase sufficient food for consumption.
Data collection method. The respondent is asked whether the household took a loan to obtain food in the last month, either in cash or in kind.
Findings. *General* - The percentage of households that took a food loan was on average 5% in Dhaka, 9% in Chittagong and 14% in Khulna. The percentage was generally highest in Dec/Jan and lowest in Jun/Jul. *Dhaka slums* - The percentage was lower than in Chittagong and Khulna throughout the year, ranging from 4% in Apr/May and Oct/Nov to 7% in Aug/Sep. This suggests that households in the Dhaka slums were more food secure than in the other two cities.

Breastfeeding of children aged <60 mo (See Fig 2)
What is indicated. Infants and young children should be exclusively breastfed for the first 6 mo of life because of nutritional and health benefits. Breastfeeding should continue well into the second year of life, complemented with nutritious foods from 6 mo of age.
Data collection method. The mother is asked whether her child is currently breastfed.
Findings. *General* - In all three cities the majority of mothers breastfed their children well into the second year of life (≥88% of children aged 12-14 mo and ≥74% of children aged 21-23 mo), and many for much longer. *Dhaka slums* - Children in the Dhaka slums appear to stop breastfeeding at a younger age than in Khulna and Chittagong. However, the magnitude of the differences between the three cities was small, and the percentage of breastfed children in Dhaka was high (88% of children aged 12-14 mo and 74% of children aged 21-23 mo).

Vitamin A capsule receipt in children aged 12-59 mo (See Fig 3)
What is indicated. Preschool children in Bangladesh need vitamin A supplements because their diet does not supply enough vitamin A and so they are at high risk of illness, blindness and dying due to vitamin A deficiency. The Government of Bangladesh currently aims to give every child aged 12-59 mo a high-dose vitamin A capsule (VAC) containing 200,000 IU twice a year at six-monthly intervals during the National Immunization Days for polio. IVACG/WHO also recommend that children aged 6-11 mo be given 100,000 IU vitamin A. However, these children are currently not included in the national VAC distribution campaigns because the polio vaccine has a target age of 12-59 mo.
Data collection method. The NSP monitors the coverage of the VAC program during a round of NSP data collection that follows a VAC distribution. During the year 2001, the NSP collected data on coverage of the VAC program in Feb/Mar for the

November 2000 VAC distribution and in Jun/Jul for the May 2001 VAC distribution. The mother is asked whether her child received a VAC during the most recent distribution.

Findings. *General* - In the early 1990s, the coverage of the VAC program in children aged 12-59 months in the urban slums generally exceeded 90% in Khulna and Chittagong and 95% in Dhaka. The coverage in November 2000 and May 2001 in all urban slum sites was ≥98%. *Dhaka slums* - Coverage of the VAC program was very high at 99%.

Household energy intake (SEE FIG 4)

What is indicated. Household energy intake is used as an indicator of household poverty: households with an energy intake <1805 kcal/person/d are considered 'extreme' or 'hard-core' poor, and households with an energy intake of 1805-2122 kcal/person/d are considered 'moderate' or 'absolute' poor.[2] Household energy intake is also used as an indicator of household food security. However, this indicator neither incorporates the social or environmental dimensions of poverty, nor does it give an indication of the quality of the household diet.

Data collection method. Since December 2001, the NSP has collected data on household energy intake using a 7-day list-recall method. The respondent is asked to list all food and beverage items consumed by household members in the previous week and to estimate the quantity of each item consumed. These data are converted to a value of daily energy intake per household member.

Findings. *General* - There was considerable variation between the cities in the percentage of households with an energy intake <1805 kcal/person/d (24-50%) and 1805-2122 kcal/person/d (21-25%). *Dhaka slums* - The percentage of household with a low energy intake (<2122 kcal/person/d) was lowest of all three cities (45%). This suggests that a lower percentage of households in the Dhaka slums were poor and that households were more food secure than in Chittagong and Khulna.

Household consumption of non-cereal foods (SEE FIG 5)

What is indicated. A high quality diet, which contains a diverse range of non-cereal foods that are good sources of micronutrients, reduces the risk of micronutrient deficiencies. One way to assess the quality and diversity of the household diet is to examine how often household members eat non-cereal foods.

Table *Household demography and socio-economic status in 2001*

		Dhaka	Chittagong	Khulna
No. household members (mean)		4.8	5.7	5.2
Household crowding (median no. household members per 100 sq ft)		4.8	6.7	4.2
Female decision-maker (%)		4	4	9
Manual labor as main source of income (%)		12	16	12
Clean source of drinking water[a] (%)		100	100	97
Closed latrine (%)		99	80	99
Parent's education[b]	Mother	41	10	51
	Father	50	15	54

[a] Water obtained from hand pump, deep tube well or tap
[b] At least one year of formal education

Fig 1. *Percentage of households that took a loan for food in the last month in 2001*

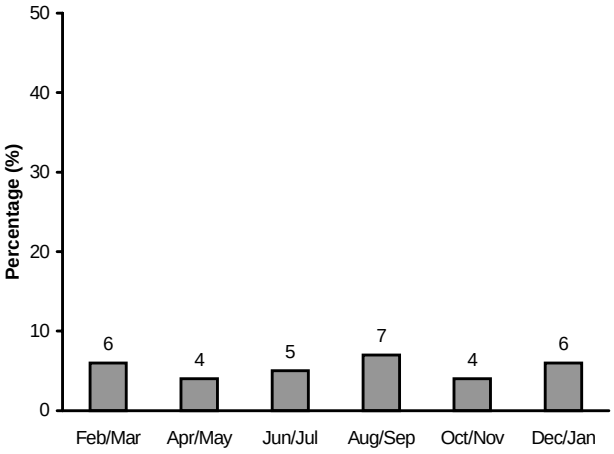


Fig 2. *Percentage of breastfed children by age in 2001*

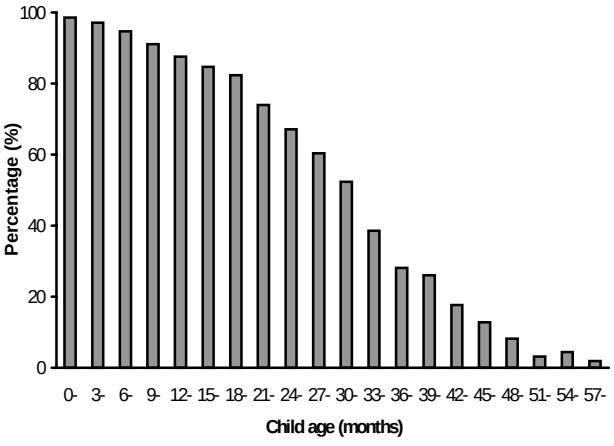


Fig 3. *VAC coverage in children aged 12-59 mo in Nov 2000 and May 2001*

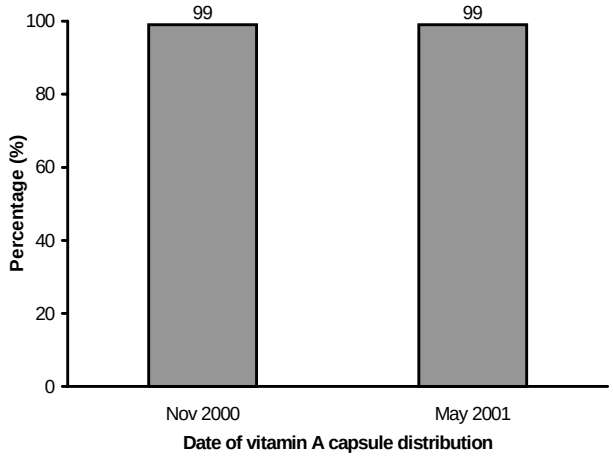


Fig 4. *Household energy intake in Dec 2001/Jan 2002*

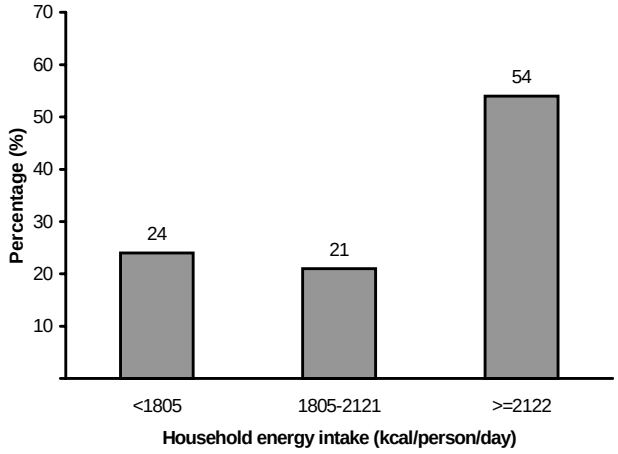
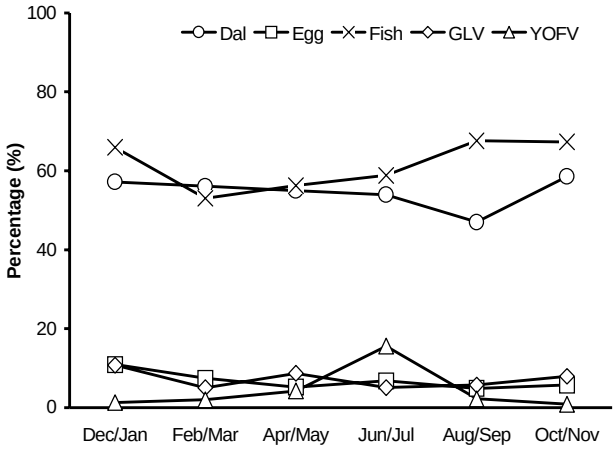


Fig 5. *Percentage of households that consumed non-cereal foods regularly (≥4 d in previous week) in 2001. GLV = green leafy vegetables; YOFV = yellow/orange fruits or vegetables*



Data collection method. The mother is asked to recall on how may days in the last 7 days the household members ate five common non-cereal foods: *dal* (lentils), eggs, green leafy vegetables, yellow/orange fruit or vegetables, and fish. A household is considered to have eaten a non-cereal food 'regularly' if household members ate it on ≥4 days in the last 7 days. As data on this indicator were not collected in Dec 2001/Jan 2002, data from the previous year are included in Fig 5 in order to show seasonal variations throughout the year.

Findings. *General* - During most of the year <10% of households in the urban slums ate yellow/orange fruits or vegetables, eggs and green leafy vegetables regularly, and 40-70% of households ate *dal* and fish regularly. *Dhaka slums* - Consumption of non-cereal foods was similar to Chittagong and Khulna, except that there was less seasonal variation. For example, the annual range in the percentage of households consuming *dal* regularly was 26% in Chittagong, 22% in Khulna, and only 10% in Dhaka.

Child and maternal diarrhea (See Fig 6)

What is indicated. Diarrhea is a form of morbidity that is relatively easy to monitor, because it occurs relatively frequently and respondents easily understand its definition. It is also a major cause of undernutrition in developing countries, particularly among young children. The prevalence of diarrhea reflects hygiene conditions both inside the house and in the neighborhood.

Data collection method. The mother is asked a series of questions to determine whether she and her child had diarrhea in the last 24 hr. Diarrhea is defined as ≥3 loose, watery or mucoid stools in 24 hr.

Findings. *General* - The prevalence of diarrhea in mothers ranged from 0.0-1.4%, while the prevalence was about five times higher among children aged 6-59 mo, ranging from 0.8-10.6%. There was no consistent seasonal pattern in diarrhea prevalence in all three cities. *Dhaka slums* - The prevalence of diarrhea in mothers was higher than in Chittagong and Khulna throughout most of the year, while the prevalence in children was intermediate between Khulna and Chittagong.

Child and maternal nightblindness (See Fig 7)

What is indicated. Vitamin A deficiency is associated with an increased risk of illness and dying and is a leading cause of blindness among children and mothers. Nightblindness is the first clinical sign of vitamin A deficiency and is considered to be a public health problem in areas where the prevalence in

children aged 18-59 mo is ≥1%. For each person affected by nightblindness in a population, there are many more with a low vitamin A level, which increases their risk of illness and dying.

Data collection method. The mother is asked whether she or her child have difficulty seeing and therefore moving around when there is insufficient light, for example, at dusk. Fieldworkers verify that this is due to nightblindness and not to any other sight defect.

Findings. *General* - The data collected in 2001 show that the prevalence of nightblindness in children in the three cities was below the level that signals a public health problem. This is largely due to the high VAC coverage, which prevents a chronic vitamin A deficiency problem that would be caused by poor diet and repeated infections in these urban slums. The prevalence in non-pregnant mothers was also low (<1%). *Dhaka slums* - None of the children aged 18-59 mo or non-pregnant mothers interviewed in 2001 was nightblind.

Maternal wasting (See Fig 8)

What is indicated. Wasting among mothers threatens both their health and survival because it increases their susceptibility to life-threatening diseases and their risk of dying, especially during childbirth. Wasted mothers are more likely to give birth to small infants and to be physically weak. The prevalence of adult wasting indicates a 'critical' food insecurity situation in areas where it is ≥40% and a 'serious' food insecurity situation in areas where it is 20-39%.

Data collection method. Wasting in non-pregnant women is defined as a body mass index (BMI) below 18.5 kg/m^2, which is calculated by dividing body weight by the square of height.

Findings. *General* - There was a large variation in the prevalence of maternal wasting between the three cities: the overall prevalence in 2001 in Chittagong (39%) was considerably higher than Khulna (29%) and almost twice as high as Dhaka (21%). In all three cities the prevalence fluctuated seasonally, peaking in Feb/Mar to Apr/May and falling in Aug/Sep. *Dhaka slums* - The prevalence of maternal wasting was lower than in Chittagong and Khulna throughout the year.

Child wasting (See Fig 9)

What is indicated. Child wasting (low weight for height) results directly from an inadequate intake of food and/or from diseases. It reflects recent or current nutritional status. The prevalence of child wasting indicates a 'critical' problem in areas where it is ≥15% and a 'serious' problem in areas where it is 10-14%.

Fig 6. *Percentage of children aged 6-59 mo and mothers with diarrhea in the previous 24 hr in 2001*

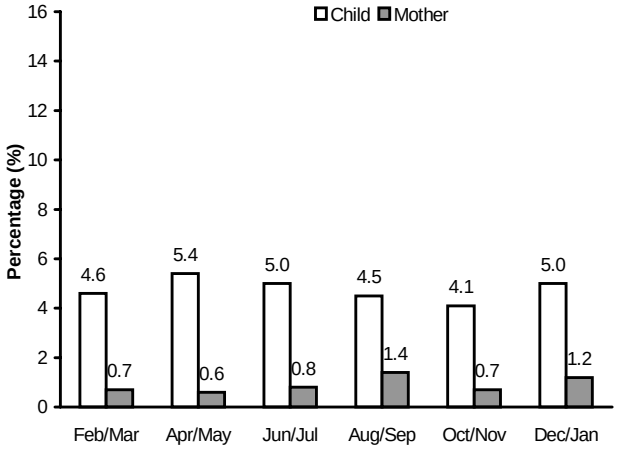


Fig 7. *Percentage of children aged 18-59 mo and non-pregnant mothers with nightblindness in 2001*

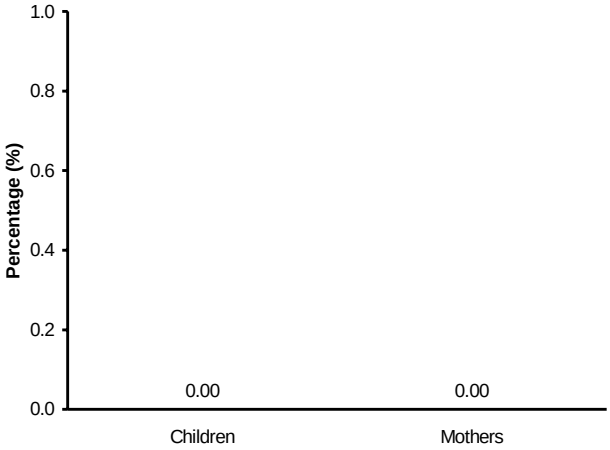


Fig 8. *Percentage of wasted non-pregnant mothers (BMI<18.5 kg/m^2) in 2001*

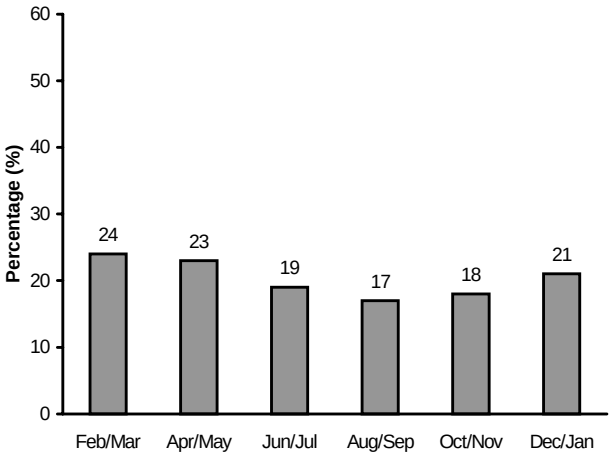


Fig 9. *Percentage of wasted children (WHZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001*

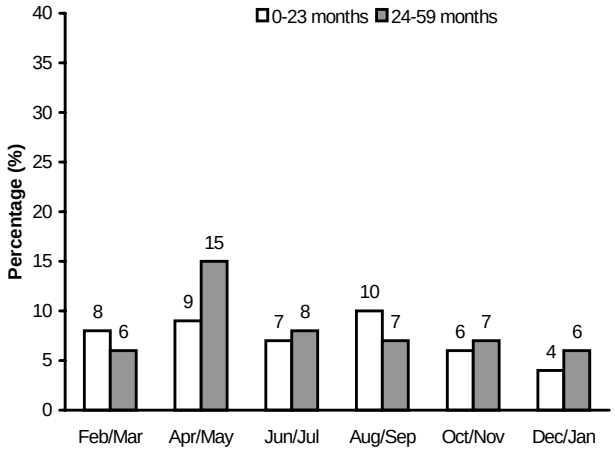


Fig 10. *Percentage of stunted children (HAZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001*

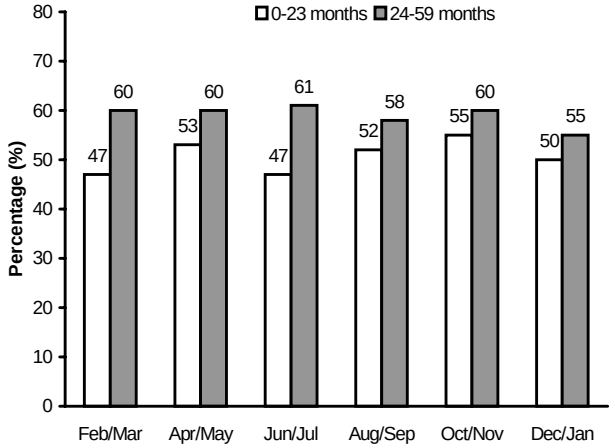
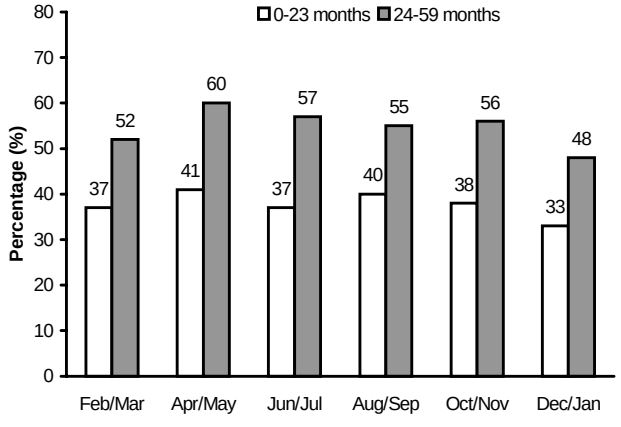


Fig 11. *Percentage of underweight children (WAZ <-2 SD) aged 0-23 mo and 24-59 mo in 2001.*



Data collection method. Child wasting is defined as a weight for height z-score <-2 standard deviations (SD) of the median of the reference population (NCHS).

Findings. *General* - Between 4-35% of children aged 0-23 mo and 4-15% of children aged 24-59 mo in the three cities were wasted during each round of data collection. The prevalence was highest in Apr/May or Jun/Jul and lowest in Dec/Jan or Feb/Mar. *Dhaka slums* - The prevalence of wasting in children was similar to Khulna throughout most of the year and was considerably lower than in Chittagong. Contrary to Khulna and Chittagong, the prevalence was generally slightly higher in the older children.

Child stunting (See Fig 10)

What is indicated. Stunting (low height for age) results from consumption of a diet of inadequate quality for a prolonged period of time. As stunting takes time to develop, it reflects past nutritional status or chronic undernutrition. A prevalence of ≥40% is considered to be 'very high' and a prevalence of 30-39% is considered 'high'.

Data collection method. Child stunting is defined as a height for age z-score <-2 SD of the median of the reference population (NCHS).

Findings. *General* - Between 37-55% of children aged 0-23 months and 48-68% of children aged 24-59 mo in the three cities were stunted during each round of data collection. The prevalence of stunting in the older children was generally higher than in the younger children, and was 'very high' in both groups of children throughout most of the year. There was no consistent seasonal pattern in child stunting in all three cities. *Dhaka slums* - The prevalence of stunting was higher than in the other two cities, except among children aged 24-59 mo in Chittagong.

Child underweight (See Fig 11)

What is indicated. Underweight (low weight for age) can be the result of wasting and/or stunting. A prevalence of ≥30% is considered to be 'very high'.

Data collection method. Child underweight is defined as weight for age z-score <-2 SD of the median of the reference population (NCHS).

Findings. *General* - Between 33-68% of children aged 0-23 mo and 48-71% of children aged 24-59 mo in the three cities were underweight during each round of data collection. The prevalence of underweight was 'very high' throughout the year and was generally higher in older children than in younger children. The prevalence was generally lowest in Dec/Jan but it peaked at different times of the year in the

different cities. *Dhaka slums* - The prevalence of underweight in children 0-23 mo was slightly higher than in Khulna, while the prevalence in children aged 24-59 mo was slightly lower, but the overall prevalence was similar. The prevalence in both younger and older children was lower than in Chittagong.

CONCLUSIONS

The scale of urban poverty in Bangladesh has become a critical policy issue. If current trends continue, it is predicted that the numbers affected by urban poverty will rise to 23 million by 2010.[3] Many poor households live in the slums of the three largest cities - Dhaka, Chittagong and Khulna - which grew by 67%[4,a] between 1986 and 1997. Data collected by the NSP in 2001 show that the health and nutrition of slum residents varies considerably between these cities. Although this heterogeneity makes it difficult to generalize the findings, it is clear that widespread poverty, poor health and malnutrition are common to all the urban slums, and that the problems are of similar magnitude, if not worse, than in rural Bangladesh.

The NSP findings for the Dhaka urban slums indicate that household food insecurity and poverty were less serious problems than in the slums of Chittagong and Khulna. This may reflect better opportunities to earn income in Dhaka city and consequently higher household purchasing power, despite the higher cost of living. Even so, almost one half of households (46%) had an energy intake <2122 kcal/person/d and were therefore considered 'moderately' poor, including 24% that had an intake <1805 kcal/person/d and were considered 'extremely' poor. The prevalence of maternal wasting (17-24%) indicates a 'serious' food insecurity situation throughout much of the year, while the prevalence of child stunting (47-55% in children aged 0-23 mo and 55-61% in children aged 24-59 mo) and child underweight (33-41% in children aged 0-23 mo and 48-60% in children aged 24-59 mo) were both 'very high' according to international criteria.

The VAC program had a very high coverage (99%) among children in the Dhaka slums and none of the children sampled by the NSP in 2001 was nightblind. However, an anemia survey conducted by the NSP in 1999 revealed an extremely high prevalence of anemia in children aged 6-59 mo (71%)[5], which, together with the high prevalence of child stunting, suggests that the diet contains insufficient micronutrients. The relatively high prevalence of diarrhea in mothers and children suggests that environmental sanitation and hygiene conditions were poor, even though two contributing factors, access to clean water and closed latrines, was good.

The diversity in urban conditions in Bangladesh means that the most appropriate solutions to the problems may not be the same for all urban slums. Nonetheless, a number of common themes exist. Direct nutrition interventions are needed to assist those affected by malnutrition, including nutritional rehabilitation and direct feeding programs for the severely malnourished; micronutrient supplementation to prevent and control anemia and vitamin A deficiency among those at highest risk, particularly young children and women of child-bearing age; and food fortification to improve the micronutrient status of the population as a whole. Households in the urban slums need better opportunities to earn income so that they can afford a more nutritious and diversified diet. All food and urban development policies and programs should place greater emphasis on interventions to improve household food security, including employment and income creation, credit facilities, and food assistance. Urban households can also improve their access to food by using appropriate gardening practices to grow vegetables and fruits, as successfully demonstrated by HKI in urban slums in Bangladesh. Infectious diseases such as diarrhea are still a major cause of malnutrition, and so urban infrastructure needs to be improved so that households have a sanitary environment and better access to preventive and curative health services. These interventions should be complemented with poverty alleviation strategies that support labor-intensive economic growth, sound macroeconomic management, good governance and social development, including the empowerment of women, and by global trade policies that stimulate the growth of Bangladesh's economy. Surveillance should be used to monitor the implementation of policies and programs and to assess their impact.

[a]Slum population of the statistical metropolitan area.

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